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EFFECTS OF VERBAL REINFORCEMENT ON INTELLECTIVE TASK PERFORMANCE AS A FUNCTION OF SELF-ESTEEM AND TASK-INVOLVEMENT. FINAL REPORT.

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USE OF THE VERBAL REINFORCEMENT TECHNIQUE (VRT) IN DEVELOPMENTAL, PERSONALITY, AND SOCIALIZATION STUDIES OFTEN RESTS ON TENUOUS AND UNTESTED ASSUMPTIONS. THIS STUDY EXAMINED FIVE VARIABLES WHICH HYPOTHETICALLY RELATE TO PERFORMANCE UNDER REINFORCEMENT--SELF-ESTEEM OF S. TASK-INVOLVEMENT, EXPERIMENTER, ORDINAL POSITION, AND FAMILY SIZE. THE METHOD CONTROLLED AGAINST INFORMATIONAL ADVANTAGES FOR THE NEGATIVE OR POSITIVE REINFORCEMENT CONDITIONS. SS WERE COLLEGE MALES. POSTEXPERIMENTAL DATA (FROM AN INTERVIEW) INDICATED INDUCTION OF ALL THE MPUTED VARIABLES. RESULTS WERE THAT VR HAD A MAIN EFFECT ON PERFORMANCE (DIGIT-SYMBOL TASK). NEGATIVE REINFORCEMENT WAS SUPERIOR TO BOTH POSITIVE REINFORCEMENT AND TO NONEVALUATIVE INSTRUCTIONS, SUGGESTING A PSYCHOLOGICAL DIFFERENCE BETWEEN CRITICISM AND PRAISE. LOW SELF-ESTEEM SS IMPROVED MORE UNDER CRITICISM THAN DID HIGH SELF-ESTEEM SS. THE ONLY OTHER VARIABLE INTERACTING WITH REINFORCEMENT WAS FAMILY SIZE. SAMLL-FAMILY SS RESPONDED MORE TO REINFORCEMENT PER SE AND SPECIFICALLY TO POSITIVE REINFORCEMENT THAN LARGE-FAMILY SS. THIS FINDING APPEARS INCONSISTENT WITH THE SATIATION HYPOTHESIS. FAILURE OF OTHER VARIABLES TO INTERACT WITH VR, IN SPITE OF EVIDENCE THAT THESE VARIABLES WERE SUCCESSFULLY MANIPULATED, SUGGESTS THE ASSUMPTIONS OF MUCH VR RESEARCH NEED MORE DIRECT TESTING. (AUTHOR)

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Effects of Verbal Reinforcement on Intellective Task Performance as a Function of Self-Esteem and Task-Involvement

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SUMMARY

The verbal reinforcement technique (VRT) has had long recognition and use as a method to study personality, and various educational, developmental, and socialization processes. A recent review of the experimental literature in schizophrenia (Buss and Lang, 1965), for example, showed that one of the chief methods employed was the VRT. Similarly, this method is often used in studies of child development (Bell, 1965).

Frequently, however, the VRT rests on assumptions which may be false or tenuous. These concern hypothetical links between past socialization processes and current behavior under VR. Examples are: a) that persons having experienced a punitive environment during the formative years will subsequently be hypersensitive to criticisms (censure-deficit hypothesis), or b) such persons will subsequently be untrusting of rewards (praise-decrement hypothesis), or c) that individuals raised in a sub-culture where interpersonal exchanges included much VR will, relative to others, be less affected by VR as adults (satiation hypothesis).

The present study investigated the effects of VR in combination with personality (self-esteem), situational (task-involvement, experimenter effect), and demographic (ordinal position, family size) variables. All the variables studied could either a priori or in light of previous studies, be reasonably expected to interact with VR to affect performances.

Ss were male college freshmen paid $2 for participation in one of the two experiments. The performance criterion was gain of response time in a two-series digit-symbol substitution task. Series-one was a baseline measure; series-two involved the experimental manipulations.

Experiment I had a 3 x 2 design (72 Ss) varying reinforcement (negative, positive, nonevaluative) and self-esteem of S (high, low). E was a middle-aged, male psychology professor. Experiment II used a 2 x 2 x 2 design (48 Ss) varying reinforcement (negative, positive), self-esteem (high, low), and task-involvement (involved, noninvolved). Its E was a departmental assistant and senior at the college. Neither E knew the Ss, nor was familiar with the study's hypotheses or prior VR research.

Self-esteem was measured in a previous administration of the Tennessee Self-Concept Scale, which correlated .74 with another self-esteem scale. Data had also been gathered on Ss' birth order and family size.

Task-involvement was manipulated in Experiment II by telling half the Ss that the task was a measure of intellect often used by psychologists.

The experimenter effect was not incorporated into the design, nor systematically varied. However, there were perceptible role differences between the two Es. There was a strong possibility this variable could relate to performance, and its effect was potentially detectable in the analysis.

Reinforcement consisted of positive, negative, or neutral comments applied to specific trials of S's series-two performance. Comments were geared to S's own median response time as determined from the series-one performance. Thus information conveyed by positive and negative statements was equivalent, correcting a fault of some earlier VR studies.

Responses to postexperimental interview questions indicated the independent variables were manipulated effectively. Self-ratings of performances predictably differentiated reinforcement conditions ($p < .005$), self-esteem categories ($p < .01$), and influence of experimenter ($p < .005$). Ratings of task-involvement suggested the instructions for this variable were successful ($p < .06$).

Analyses of variance were conducted for Experiments I and II. Data from both experiments were then combined to test for experimenter, birth order, and family size effects.

Negative reinforcement was superior to both positive reinforcement and nonevaluation. This result agrees with earlier studies using medical patients, schizophrenics, and middle-class children. It appears that criticism has a psychological advantage over praise for many kinds of Ss.

The only observed relationship of self-esteem to VR was that low self-esteem Ss were more responsive to negative evaluation than were high self-esteem Ss. Previous papers have suggested the possibility of a "praise-decrement" hypothesis for low self-esteem schizophrenic Ss. However, no evidence for the praise decrement was found in the present study with college Ss.

Family size was the only variable (excepting reinforcement) to show a tendency of a main effect or to interact with reinforcement. Members of small families were significantly more responsive than large family members to reinforcement per se, and specifically to positive reinforcement. This seems contrary to the satiation hypothesis which holds that the person having little early experience with VR is most responsive to it. It might well be assumed that small family members, because they tend to be more middle-class or because they have more intense exposure to parents, receive more VR experience. According to the satiation hypothesis, the large family subject should therefore be more responsive to VR.

A finding such as this which relates family size or social class to responsiveness to reinforcement has definite implications for socialization and educational processes.

An important aspect of this study is the failure of VR to interact with other key variables, although VR itself had a consistent main effect, and the other variables appeared to be induced. The suggestion is that assumptions made in using the VRT have been poorly founded. Future research in VR might well proceed by exploring the untested hypothetical links between early experiences with and current reactions to verbal reinforcements.

INTRODUCTION

The verbal reinforcement technique (hereafter, VRT) has been broadly used as a method to investigate personality, interpersonal effects, and socialization processes. For example, in a review of the experimental literature in schizophrenia, Buss and Lang (4) and Lang and Buss (16) cited well over three hundred references. Most of these were laboratory studies in which one of the chief methods used was some variation of the basic VRT, namely, to observe the effects of praise and criticism on S's behavior. In child study the technique is often used to study social and interpersonal effects (Zigler and Kanzer, 33; Berkowitz, Butterfield, and Zigler, 3).

The impetus for the present study (which used college Ss) stemmed from an interest in the VRT to study interpersonal hypotheses of schizophrenia. There have been shifts of logic in the explanations of why schizophrenics respond the way they do to social reinforcements (Fischer, 8). This followed a period of confusion about how schizophrenics do react to social reinforcements, and in particular to censure. For example, Garmezy (11) and Webb (31) found schizophrenics to be disrupted by criticism of their performances, whereas later studies (Leventhal, 17; Cavanaugh, Cohen, and Lang, 6) showed that schizophrenics could be effectively motivated by criticism. In much of this experimentation the working hypothesis was that schizophrenics are socialized in a censorious environment, and that criticism is "cue relevant" for them in contrast to nonschizophrenic persons (Rodnick and Garmezy, 19). This idea was at least partially weakened when it was found that normal control Ss responded to criticism much the same as did schizophrenics (Goodstein, Guertin, and Blackburn, 13).

It is the authors' opinion that the VRT is potentially useful in many kinds of study, including the investigation of complex social and personality phenomena. However, there are often one or more tenuous assumptions in such research; for example, that a background of excessive punishment predisposes one to be threatened by criticism (censure-deficit hypothesis), or to be untrusting of rewards (praise-decrement hypothesis). It is obvious that use of the VRT in personality, educational, and social research could proceed more confidently if key a priori assumptions were first carefully examined. While direct testing of certain hypotheses is impossible, there is a fast-growing range of experiments which explore some of the critical variables.

The present study addresses itself to some of the assumptions which have been implicit in VR research, by examining several variables thought to be relevant to such research. It is believed that VR experiments can have meaning and applicability well beyond the scope of the immediate laboratory situation. Examples can be found in therapuetic and counseling practices, in the socialization of developing children, as well as in the formal educative processes.

The hypotheses of this study can be divided into four areas, according to the kind of variable studied.

I. Hypotheses concerning normative reactions to criticism and praise, relative to nonevaluation.

Intuitively or according to the "Truncated Law of Effect" (Hilgard, 14) it might be judged that normal persons are more responsive to praise than to criticism. But most current evidence does not support this contention. A study by Atkinson and Robinson (1) found that non-psychiatric, normal Ss learned better under positive than under negative reinforcement (whereas the reverse held for schizophrenic Ss). Also, Butterfield and Zigler (5) found that approval and disapproval had about equal effects on both normal and retarded children. However, studies by Goodstein, et al (13) and Spence (28) showed that criticism is more effective in motivating the performances of subjects.

One of the methodological difficulties involved in this question is the amount of information that is conveyed to S by a negative as opposed to a positive comment on performance. For example, if S is told in a reaction-time task, "You're too slow," the implication is that he must speed up. But if he is told, "Good, you're doing fine," the implication is he would do well to maintain his current pace. Thus when criticism leads to better results than praise, it may be a function of differential information being communicated, rather than the psychological or connotative value of criticism versus praise. This is especially problematical in studies comparing schizophrenics and normals. The normals may be cognitively clear enough to take advantage of the informational differences, but the schizophrenics often are not.

However, in studies where verbal reinforcements have been appropriately given according to the excellence or poorness of a particular trial, and based on S's individual norm (Fischer, 9; Klein, Cicchetti, and Spohn, 15), criticism is found to be more effective than praise.

It was hypothesized that for college subjects:

A. Negative reinforcement will improve performance better than nonevaluation.

B. Negative reinforcement will improve performance better than positive reinforcement.

C. Positive reinforcement will improve performance more than nonevaluation.

II. The personality variable: hypotheses pertaining to self-esteem of Ss.

Differences in the responsiveness of schizophrenics and normals to social reinforcement have been explained in terms of the former's low self-esteem. Some experimental evidence indicates that something like a "praise-decrement" hypothesis may be valid for at least certain types of schizophrenics (Fischer and Hoch, 10; Schooler and Tecce, 25). The explanation is that schizophrenics are uncomfortable with praise and positive evaluations, which are dissonant with their low self-image. Hence, praise may disrupt the schizophrenic and his performance suffers, even by contrast with a nonevaluative control condition. Whether this idea is valid only for schizophrenics or extends to normal Ss can be partially tested in the present study.

The hypotheses were:

D. High self-esteem Ss do better under positive reinforcement than low self-esteem Ss.

E. Low self-esteem Ss do better under negative reinforcement than high self-esteem Ss.

F. Negative reinforcement better differentiates performances of high and low self-esteem Ss than does positive reinforcement.

III. The situational variable: hypotheses concerning task-involvement and experimenter effects.

An important but often neglected variable in VR research is the degree of involvement of S in the behavior being evaluated. Many child studies and occasionally studies of mental patients introduce the experimental task as a "game". This is done to enlist S's interest, but it may have the effect of licensing a superficial performance from S. Evaluative comments should have far greater impact when S sees his task as an intelligence test, compared to when he perceives it as an experimental contrivance of the psychologist.

Wells (32) considered task-involvement from another viewpoint. Experimenters often assume lack of involvement under nonevaluative control conditions. In fact, though, S may perceive a "nonevaluative" condition as highly evaluative, particularly if his performance is being monitored by a psychologist in an institutional setting such as a mental hospital. Wells demonstrated that the subtle difference between a seemingly nonevaluative and an authentically nonevaluative condition is meaningful for behavior, even among regressed psychotic Ss.

The hypotheses relevant to task-involvement were quite general:

G. Under conditions of reinforcement, there will be a performance difference between involved and non-involved Ss.

H. The nature of performances under involvement and non-involvement will differ for different conditions of verbal reinforcement, i.e., there will be a reinforcement x task-involvement interaction.

Another theoretically crucial factor in VR experimentation lies in the source of evaluation (experimenter effect). The significance of role variation has had attention in recent studies. Shultz and Hartup (26) found that college males were differentially responsive to Es varying in sex and masculinity-femininity. Klein, Cicchetti, and Sophn (15) found both schizophrenic and normal Ss responded more to male than female Es. Their result was explained in terms of the greater authority of male Es. Goodman (12) divided schizophrenic Ss on the basis of "good" and "poor" premorbid histories; hypothetically goods come from father-dominated families and poors come from mother-dominated families. Goodman found, as predicted, that goods were more sensitive to father-son, and poors to mother-son role protrayals in which the parent figures administered reinforcements.

The design of the present study does not treat variation of E systematically. However, since two experiments were performed, members of two complimentary college roles (faculty member and student) were selected as Es.

Again, the prediction was general - no direction of differences was hypothesized:

I. Es representing faculty and student roles will affect performances of college Ss differently.

IV. Demographic characteristics of Ss: birth order and family size.

Birth order is important psychologically in that potentially it mediates variable behavior from parents toward their offspring. Much recent writing on the topic emphasizes the distinction first-born versus later born. The thinking is that parents are more apt to be attentive and solicitous toward firstborn than later born children. The result is greater dependence and need for affiliation and approval on the part of firstborn (Schachter, 24; Sampson, 23; Moran, 18).

On the basis of this past research, it was predicted that:

J. Firstborn Ss are more responsive to verbal reinforcements than later born Ss.

Socioeconomic class has probably been the most frequently used background or demographic factor in VR studies. Rosenthal (21) predicted that, relative to middle-class children, lower-class children would be more responsive to approval than to disapproval. This was confirmed with both Negro and white Ss.

Although there was no direct measure of socioeconomic class taken in the present study, family size (number of children in the family) was recorded along with the birth order data.

It was expected that family size would interact with the reinforcement variable because: 1) it may be an indicant of social class, and 2) the nature of interpersonal relationships and therefore the amount of and distribution of verbal reinforcements are likely to vary by family size.

The final hypothesis, then, was:

K. Ss from large families are more responsive to verbal reinforcements than Ss from small families.

METHOD

Subjects

Ss were male freshmen at Trinity College. In September they were given the 20-item Tennessee Self-Concept Scale (29), as modified by Solomon and Klein (27), and the 13-item Rosenberg (20) scale of self-esteem. They were also asked to provide data on ordinal position and family size. In February of the next year Ss were selected on the basis of Tennessee scores and, within self-esteem groupings, randomly assigned to experimental treatments. Ss were then sent a notice by the appropriate E. They were paid $2 following participation in the study.

Task

The experimental task involved two identical series of digit-symbol substitution trials. The series consisted of nine trials of twelve substitutions per trial. Each trial was completed on a separate 8 1/2 x 11" sheet of paper containing the substitution key and the twelve trial digits (see Figure 1). Time to complete a trial (response time) was measured with an electronic timer and recorded for every trial.

Design and procedure

The manipulations were accomplished in two experiments. The E for Experiment I was a middle-aged, male psychology professor. He addressed Ss as "Mr. _____," and referred to himself as "Dr. _____." Experiment I had three conditions of reinforcement (negative, positive, and nonevaluative) and two self-esteem subject classifications (high self-esteem Ss were those scoring from 30-40 on the Tennessee Self-Concept Scale; low self-esteem Ss were those scoring from 0-20[1]). There was a total of 72 Ss in the 3 x 2 design.

The E for Experiment II was a departmental assistant and senior at the college. He introduced himself as "Bill _____," and addressed Ss by their first names. Experiment II used a 2 x 2 x 2 design: two conditions of reinforcement (negative and positive), two self-esteem classifications (high and low), and two levels of task-involvement (noninvolved, and involved). Each cell of the design contained 6 Ss for a total N of 48.

[1]The cutoff points of 20 and 30 divided the total distribution of Tennessee scores approximately into thirds. Both the Tennessee and Rosenberg scales were scored according to "agree" versus "disagree" responses to the items. The correlation between the Tennessee and Rosenberg scales was $r = .74$, for Ss who participated in the experiments.

Figure 1
Digit-Symbol Substitution Task

Key

0 1 2 3 4 5 6 7 8 9

Trials Within a Series

Trial	Digits
1	1-4-0-9-5-3-2-8-7-6-7-9
2	0-5-4-3-8-6-2-1-1-4-3-5
3	6-7-8-2-9-5-2-6-1-4-0-9
4	5-4-3-8-6-2-1-1-4-3-5-0
5	6-9-0-2-4-5-1-7-6-3-4-9
6	8-7-3-0-1-4-2-3-6-7-8-9
7	5-1-0-0-6-7-3-8-8-3-3-3
8	9-5-3-4-4-3-2-2-4-4-4-7
9	7-0-9-3-4-2-4-4-2-2-7-7

In all cases Ss were met outside the experimental room by E. S was taken into the experimental booth and shown a practice trial sheet which contained the substitution key and three trials. E explained the task and indicated that S's response times were to be recorded. S then completed the three practice trials and was shown a second practice sheet:

> "Now here is a sheet with only one trial. This is more like what you'll be doing for the remaining time. [E places sheet in front of S, face downward] . When I say 'go,' turn the paper over and fill in the blank spaces."

When S finished, E said:

> "We will repeat this procedure a number of times. Don't forget to finish each trial as quickly as possible, but make sure that you make each symbol correctly. Are there any questions?"

At the completion of the first series of trials, E excused himself and left the experimental booth for about two minutes. During this break he determined S's median speed for the first series of trials. The median speed was used as the criterion for reinforcement in the second series of trials.

The experimental manipulations took place after the first--baseline--series of trials had been completed. In Experiment II Ss assigned to the "involvement" condition were told:

> "I didn't want to tell you this before because I wanted a control measure of your performance -- but something much like this, called a 'digit-symbol' task, is used in intelligence tests, such as the Wechsler Adult Intelligence Scale. In other words your performance on this task is highly correlated with intelligence. Now I want to go through a series of trials again."

The "noninvolved" Ss of Experiment II (and all Ss in Experiment I) were told prior to series two:

> "Okay, now I want to go through a series of trials again."

In both experiments the reinforcement conditions were manipulated as follows. Ss in the negative reinforcement condition received at least one but not more than three comments applied to individual trials of series two. Examples of such comments are: "That one was too slow, (NAME); try to speed it up," and "Again you were too slow; you'll have to go faster if you want to hit the average of what others are doing."

Ss in the positive reinforcement condition also received at least one but no more than three evaluative comments such as: "Very good, (NAME); your time was really good on that one," and "Good; your speed was well above average on that trial."

The statements were always consistent with S's own performance, i. e., a negative comment only followed a trial slower than S's median series one speed; a positive comment only followed a trial which was faster than S's median series one speed. Reinforcing statements never occurred following the first trial of the series.

Both Es knew they were helping to conduct a study of verbal reinforcement. However, Es neither knew the study's hypotheses nor were familiar with the verbal reinforcement literature.

A postexperimental interview followed completion of the series-two trials. The interview questions were intended to get at responses which would reflect the effectiveness of the experimental manipulations.

Ss were then paid and thanked for participation.

RESULTS

Experimental manipulations

In order to judge the influence of the independent variables on performances, it was first necessary to establish that the intended manipulations were successful. Responses to several of the postexperimental questions suggested that the main variables of the study elicited strong effects. The results corresponding to two of the most relevant questions will be summarized here.

Ss were asked to judge how well they did at the task, on a 3-point scale ("very good" = 3, "okay" = 2, and "poor" = 1). The responses to this item differentiated Ss according to the reinforcement and self-esteem categories, and by experimenter.

Distinctions for reinforcement were as expected with means at 2.41, 1.87, and 1.81 for all Ss in the positive, nonevaluative, and negative conditions, respectively. Simple analysis of variance of the ratings for the three groups indicated significant differences ($F = 13.14$, $df = 2/117$, $p < .005$).

Mean ratings for high and low self-esteem Ss were also as expected: 2.22 and 1.92, respectively. The difference is statistically reliable ($t = 2.52$, $df = 118$, $p < .01$, one-tail test).

Also, comparing the ratings of Experiment I Ss (excluding the nonevaluative group) with those of the "noninvolved" Ss of Experiment II should reveal an experimenter effect. The only known distinction between these two groups was the E and his manner of reinforcing Ss. The mean ratings were 2.46 for E II and 1.92 for E I ($t = 3.48$, $df = 71$, $p < .005$, two-tail test). This suggests a very strong experimenter effect.

Thus, insofar as self-estimations of performance go, it appears that these three variables were effective: praised Ss rated themselves higher than criticized Ss, high self-esteem Ss gave themselves better ratings than low self-esteem Ss, and there was a clear distinction for ratings under the two experimenters.

Ss were also asked to rate how involved they were in the task. These ratings were made on a 5-point scale ranging from "barely at all" (1), to "much involved" (5). The mean rating for all 120 Ss was quite high (3.95), indicating generally good task-involvement. This item was specifically useful for testing the "involvement" instructions of Experiment II, in which half the Ss were told that the task correlates highly with intelligence. Mean ratings of the involved versus the noninvolved Ss were 4.08 and 3.67, respectively. This difference is at borderline significance ($t = 1.67$, $df = 46$, $p < .06$, one-tail test), suggesting the involvement instructions were effective.

Performance criteria

Both substitution errors and response times were available as dependent measures of task performance. However, errors proved to be inconsequential. Ss averaged 1 error per 108 opportunities for error in a series of nine trials. This was expected, since the difficulty of the digit-symbol substitution task comes in doing it rapidly, not in doing it accurately. Thus, response time was the principle dependent variable.

In the preliminary coding of the data it was discovered that, for both experiments, negative reinforcement statements tended to come earlier in the series of trials than did positive reinforcement statements ($t = 2.69$, $df = 94$, $p < .01$, two-tail test). Had the time scores consisted of the mean gains for all trials, there would have been a bias favoring negative reinforcement. Instead, mean time scores were computed for trials which followed the first reinforcing statement in a given case. The mean gain in response time (series-one minus series-two) was the performance criterion, in all analyses.

Performance effects

The results of Experiment I are presented in Table 1. There is a tendency toward a significant effect for reinforcement ($p < .06$), but no main effect for self-esteem, and no interaction of the two variables.

In Experiment II (Table 2) there was a definite effect of reinforcement ($p < .03$), indicating the superiority of negative to positive reinforcement on Ss' performances (Hypothesis B). But there was no main effect for self-esteem, task-involvement, or for the various interactions.

Data from the two experiments were combined for the additional analyses. Table 3 shows the mean gains in response time by reinforcement condition and self-esteem of S.

Two additional hypotheses concerning the reinforcement and self-esteem variables were confirmed with t-tests. Negative reinforcement improves performance more than nonevaluation ($t = 2.56$, $df = 69$, $p < .01$, one-tail test) (Hypothesis A). Also, there is a tendency for low self-esteem Ss to improve more than high self-esteem Ss, under conditions of negative reinforcement ($t = 1.54$, $df = 46$, $p < .07$, one-tail test) (Hypothesis E).

The possibility of an experimenter effect on performance was assessed by combining the negative and positive reinforcement blocks of Experiment I with those of Experiment II. Since the analysis of Experiment II (Table 2) revealed no effect for task-involvement, it was assumed the treatment conditions were similar to those of Experiment I (exclusive of the possible experimenter effect). As pointed out in the introduction, the experimenter variable was not systematically incorporated into the experimental design. However, there may have been differences

Table 1

Analysis of Variance of Response Time Gains for Experiment I:
Reinforcement and Self-esteem

Source	df	MS	F	p
Reinforcement (R)	2	2.94	3.03	.06
Self-esteem (S)	1	0.01	--	
R x S	2	1.86	1.92	ns
Error (within)	66	0.97		
Total	71			

Table 2

Analysis of Variance of Response Time Gains for Experiment II:
Reinforcement, Self-esteem, and Task-involvement

Source	df	MS	F	p
Reinforcement (R)	1	7.89	5.37	.03
Self-esteem (S)	1	1.81	1.23	ns
Task-involvement (T)	1	0.01	--	
R x S	1	0.04	--	
R x T	1	0.64	--	
S x T	1	1.84	1.25	ns
R x S x T	1	0.59	--	
Error (within)	40	1.47		
Total	47			

Table 3

Means and Standard Deviations of Response Time Gains According to Reinforcement Condition and Self-esteem

Reinforcement and Self-esteem	M	SD	N
Negative			
High	2.52	1.36	24
Low	3.05	1.01	24
All Ss	2.78	1.21	48
Positive			
High	2.10	0.97	24
Low	2.11	0.94	25
All Ss	2.10	0.95	49
Nonevaluative			
High	2.20	1.05	12
Low	1.87	0.86	11[a]
All Ss	2.04	0.96	23

Note.--this table summarizes data from both experiments combined.

[a] One S originally scheduled for the nonevaluative condition was inadvertently placed in the positive condition. Rather than run another S--which would have required the introduction of a third E-- the mean of the cell was substituted for the ANOV.

between the two experimenters in terms of role, personality, or manner of reinforcing Ss. The postexperimental questionnaire data suggested that Ss perceived some differences. If these are critical for performances, they would be detectable by the analysis summarized in Table 4. This is a 2 x 2 x 2 design formed of the combined data, and varying two levels each of reinforcement, self-esteem, and experimenter. Reinforcement again had strong effects on performance, but there were no experimenter effects, nor any interactional effects.

The possible effects of birth order were tested next. Ss were divided into two groups: firstborn versus later born. The two birth categories were then combined with the three reinforcement conditions to form a 2 x 3 design. Since the authors had no control over the number of Ss falling into the birth categories, cell n's were unequal, and the Walker and Lev (30) approximate method of analysis of variance was used. Results are summarized in Table 5, which shows no effect for birth order.

Finally, the effect of family size was observed by dichotomizing Ss as coming from small (three or fewer children) or large (four or more children) families. These family size classifications, considered with regard to reinforcement conditions, formed another 2 x 3 design which was analyzed with Walker and Lev's method (Table 6). The usual reinforcement effect appeared ($p < .01$), as did trends suggesting effects for family size ($p < .10$), and the interaction of family size with reinforcement ($p < .07$).

Individual t-tests showed that Ss from small as compared with large families responded more strongly to verbal reinforcement per se (negative and positive reinforcement conditions combined) ($t = 2.00$, $df = 90$, $p < .05$, two-tail test). However, this result was mainly attributable to the specific effect of positive reinforcement in differentiating the two groups ($t = 3.70$, $df = 43$, $p < .005$, two-tail test).

There was no reliable difference between the two family size groups for negative reinforcement alone ($t = 0.49$, $df = 45$, $p > .30$).

Table 4

Analysis of Variance of Response Time Gains for All Ss:
Reinforcement, Self-esteem, and Experimenter

Source	df	MS	F	p
Reinforcement (R)	1	11.22	9.27	.005
Self-esteem (S)	1	1.67	1.38	ns
Experimenter (E)	1	0.15	--	
R x S	1	1.75	1.45	ns
R x E	1	0.39	--	
S x E	1	0.37	--	
R x S x E	1	1.11	--	
Error (within)	88	1.21		
Total	95			

Table 5

Analysis of Variance of Response Time Gains for All Ss:

Reinforcement and Birth Order

Source	df	MS	F	p
Reinforcement (R)	2	0.33	4.71	.05
Birth Order (B)	1	0.04	--	
R x B	2	0.13	1.86	ns
Error (within)	109	0.07		
Total	114			

Table 6

Analysis of Variance of Response Time Gains for All Ss:

Reinforcement and Family Size

Source	df	MS	F	p
Reinforcement (R)	2	0.47	5.88	.01
Family Size (F)	1	0.23	2.88	.10
R x F	2	0.23	2.88	.07
Error (within)	106	0.08		
Total	111			

CONCLUSIONS

Discussion of results

This study was essentially intended to provide empirical support for use of the VRT in educational, socialization, and personality experiments. The research strategy was to examine five variables which could reasonably have been expected to interact with reinforcement in affecting performances.

There was a definite effect of reinforcement on performance in that negative evaluation increased Ss' responsiveness more than positive evaluation or nonevaluation. This result is consistent with earlier VRT studies with Veterans Administration medical patients (Spence, 28), chronic schizophrenics (Fischer, 9), and middle-class children (Rosenhan, 21). Since the present study used college males, it appears that the superior motivating effects of criticism hold across a wide range of subjects. It should also be emphasized that the present study controlled (both methodologically and statistically) against informational advantages for the negative reinforcement condition. Thus criticism seems to have a psychological advantage over praise.

One wonders how much this empirical observation could be stretched into a practical formula by which to guide human behavior. But there may be a double effect of criticism: one aspect beneficial, one deleterious for performance. Although censure appears to produce immediate gains of performance, it may also create a strained interpersonal relationship between critic and subject. Were the critic to push his effect for temporal performance gains, he might ultimately lose the subject through antagonism and avoidance tendencies.

In this same sense Dollard and Miller (7) speak of the danger of using negative reinforcements in psychotherapy. The patient may generalize his previously learned interpersonal fears to the therapy situation, and to the therapist himself. Similarly, Atkinson and Robinson (1) make the point that although criticisms may increase the patient's productive output, they may also help to perpetuate his psychopathology.

Given the empirical knowledge that criticism has greater psychological impact than praise, a logical question is why this is so. Presumably under normal circumstances one comes to expect praise as an indication of unity with the interpersonal environment. Criticisms, then, may often be cues of a disturbed interpersonal relationship, security is threatened, peers or authorities are dissatisfied, and some corrective action must take place to restore the balance. It is in this context that the psychological outlook of the low self-esteem person can be conceptualized. He may have learned during the formative years that his communion with reference groups is rather tenuous, and that censure is often forthcoming.

A finding of the present study was that, relative to high self-esteem persons, low self-esteem Ss are more responsive to criticism. This result was predicted and can be accepted as consistent with the self-perceived inferior image of the low self-esteem individual.

This study found no evidence of a "praise decrement" (Fischer and Hoch, 10) for low self-esteem Ss. Positive reinforcement was no more or less effective than nonevaluative instructions. There is of course the possibility that the praise decrement occurs in other subjects, e. g., regressed schizophrenics (Schooler and Tecce, 25), or with a task that requires more abstract abilities.

The only other variable significant to performance was family size. The general tendency was for Ss from small families to be more affected by evaluation than those from larger families. This effect was more pronounced in the case of positive reinforcement.

There are at least two stances that can be taken in interpreting this result. One is that family size reflects socioeconomic class, and that middle-class (small family) persons learn to respond to abstract reinforcers more than do lower-class (larger family) Ss. A second interpretation relates to the first but is independent of the sub-cultural explanation. This is that there is simply more opportunity to interact with the parents and to receive verbal reinforcements in the small compared to the larger family. Thus, the small family member has more intensive verbal reinforcement experiences, and responds more enthusiastically to them in adult life.

Both of these interpretations are at odds with the "satiation" hypothesis (Bell, 2). This states that persons who have experienced much reinforcement are relatively unaffected by it.

A finding which relates either family size or socioeconomic class to responsiveness to reinforcement has wide practical significance. Consider the elementary classroom situation. The middle-class teacher knowingly or unwittingly "believes in" verbal reinforcement. He likely has been conditioned to it during his own upbringing and undoubtedly has applied it successfully many times in the classroom. But what of the child who fails to respond to it? Might not there be an inclination to attribute something "wrong" with this child?

It is interesting to try to relate the finding on family size to the work of Rosenthal (22). Rosenthal showed that teachers who has falsely high expectations of pupils unknowingly gave them special attention. The attention raised the pupils output and so confirmed the teacher's expectations (a positive self-fulfilling prophecy). Supposing the teacher who expected responsiveness to blandishments failed to get it in the student from a large family. This could be the start of a negative self-fulfilling prophecy, the reverse of Rosenthal's effect.

Perhaps the most serious implication of the present study is for

the VRT itself. Four of the five independent variables employed failed to interact with verbal reinforcement to affect performances. While there is a considerable psychological literature backing the choices of self-esteem, task-involvement, experimenter differences, and ordinal position as variables, and while the questionnaire data supported the effectiveness of these variables, they had no apparent influence on performance.

Much of the past verbal reinforcement research has made assumptions concerning hypothetical links between socialization processes and current responsiveness to reinforcements. The present study at least suggests such assumptions may often be incorrect, misleading, or unwarranted.

It might be argued that this study used eighteen year old Ss, and that they are too far removed from the hypothetical socialization experiences which affect differential responsiveness to criticism and praise. However, the same objection could be raised for any verbal reinforcement studies, excepting those using children. The objection certainly would be applicable to those studies employing schizophrenic adults.

Recommendations for future research

Based on the experience of the present study, suggestions for additional research in verbal reinforcement would include some methodological as well as theoretical issues.

Specifically these are:

1. In all studies which aim to weigh the psychological effects of negative versus positive reinforcements, some method (such as the method described herein) should be used in which the positive statements convey as much information as do the negative. Also, the method should control for the possibility that one compared to another type of VR statement is consistently occurring earlier in the series of performance trials.

2. It would be useful to have a measure of attitude toward the experimenter and/or the experimental condition. This could serve to assess another result of reinforcement. For example, it may be that although performance is superior under criticism, the rapport between experimenter and subject is weakened by it. The attitude scale would also reflect the successfulness of the experimental manipulations. Ss in the present study were asked if they would mind doing something similar to what they had just completed, on another occasion. This item was intended to elicit attitudes toward the experimental condition. However, in a yes-no response format, almost all of the Ss (113) indicated they would not mind participating again. Much better discrimination within

subgroups of the design could have obtained had the Ss completed a series of graduated-response attitudinal items.

3. A future study should replicate the reinforcement x self-esteem x task-involvement experiment, but use a task which requires more abstract abilities. Many verbal reinforcement studies have employed rote tasks using reaction or response time as a dependent variable; however, some of the subtler interactional effects (such as are suggested in the 3-factor design, above) may become more apparent in performances that require abstract abilities.

4. The relationship between family size and socioeconomic class--insofar as family size is a factor in responsiveness to reinforcements--should be determined. Is family size a factor because it relates to class, differing values within the sub-culture, and therefore differential responsiveness? Or is family size per se the critical factor? E. g., the following hypothesis might be tested: reinforcements are alien to the large family member (independent of class status) in that, compared to the small family member he has less intensive experiences with them.

5. The effects of realistic social roles on responsiveness to praise and criticism could be studied. Ideally role might be treated as a factor that varies systematically as a function of single behavioral dimensions such as authority, benevolence, sex, power or status, etc.

6. Do the relative effects of praise and criticism change during development? To test this proposition the same essential research strategy would be used on a series of samples which are stratified by age or elementary school grades.

7. Related to number six, above, the influence of current socialization agencies on responsiveness to social reinforcements can be studied. Experiments might be designed to detect the effect of hospital environments, school systems, bureaucratic structures, and institutional indoctrination on the responsiveness to social reinforcement of schizophrenic patients, school children, clerical personnel, and novice nuns, prisoners, and/or soldiers, respectively.

8. Special subjects should be chosen for VRT experiments, especially those known to have excessive experiences with censure. This could be accomplished in an interview in which both parent and child are seen. During the interview, situations might be arranged which tend to elicit reprimands from the scold-prone parent. Child Ss are then chosen on the basis of amount of interaction involving censure of the child. Hypotheses which state that overcensured Ss are more vulnerable to or more sensitized to social reinforcements could thus be tested quite directly. This procedure or one like it would represent a very useful re-approach to the VRT in personality study.

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APPENDIX

Student Questionnaire

PLEASE PRINT FULL NAME ON TEAR SHEET.

Birth Order

I am (check one): ( ) an only child
( ) the oldest child
( ) a middle child in a family of _____ children.
( ) the youngest child

Below are some statements about yourself and your feelings about many issues. Read each statement and decide whether it is TRUE as applied to you or FALSE as applied to you. If you feel a statement is TRUE or MOSTLY TRUE as applied to you, circle the letter T. If a statement is FALSE or NOT USUALLY TRUE as applied to you, circle the letter F. Please answer every statement.

Please answer every statement as honestly and as accurately as possible, as it applies to you. Responses are for research purposes only and are to be kept in strictest confidence.

T F 1. On the whole, I am satisfield with myself.

T F 2. Compared to most other people I know, I feel that I am more dependent upon others.

T F 3. Compared to most other people that I know, I feel that I am in better mental health than they are.

T F 4. Compared to most other people I know, I feel that I am a worse worker than they are.

T F 5. Compared to most other people that I know, I feel that I am in worse mental health than they are.

T F 6. Compared to most other people I know, I feel that I am more important than they are.

T F 7. At times I think I am no good at all.

T F 8. I feel that I have a number of good qualities.

T F 9. I wish I could believe in myself more than I do.

T F 10. I am able to do things as well as most other people.

T F 11. I feel I do not have much to be proud of.

T F 12. Compared to most other people that I know, I feel that I am physically weaker than they are.

T F 13. I do not like to put my abilities to the test.

T F 14. Compared to most other men that I know, I feel that sexually I am more of a failure.

T F 15. I certainly feel useless at times.

T F 16. I feel that I am a person of worth, at least on an equal plane with others.

T F 17. Compared to most other people I know, I feel that I have better social upbringing than they have.

T F 18. Compared to most other people that I know, I feel that I have more contempt for myself.

T F 19. Compared to most other people that I know, I feel that I have much more control over others.

T F 20. Compared to most other people that I know, I feel that I am smarter than they are.

T F 21. Compared to most other people I know, I feel that I am a better worker than they are.

T F 22. Compared to most other people I know, I feel that I am more of a nobody than they are.

T F 23. Compared to most other people that I know, I feel that I am physically stronger than they are.

T F 24. Compared to most other people I know, I feel that I would make a worse leader than they are.

T F 25. Compared to most other men I know, I feel that I am sexually more successful.

T F 26. I wish I could have more respect for myself.

T F 27. All in all, I am inclined to feel that I am a failure.

T F 28. Compared to most other people I know, I feel that I have a worse social upbringing than they have.

T F 29. I take a positive attitude toward myself.

T F 30. I seem to have feelings of inferiority.

T F 31. Compared to most other people that I know, I feel that I have more respect for myself.

T F 32. Compared to most other people that I know, I feel that I am more stupid than they are.

T F 33. Compared to most other people that I know, I feel that I would be a better leader than they are.

34. You will notice that many questions began with the words "Compared to most other people I know..." Write briefly what people you have in mind when you think of "other people I know":

APPENDIX, CONT.

Postexperimental interview and grouped responses for all Ss.

Item		Reinforcement Condition: Negative	Positive	Nonevaluative
1. How did you feel about doing this?	Favor	25	34	10
	Unfavor.	5	1	1
	Neutral	18	14	12
2. Did you feel nervous at any time?	Yes	28	25	8
	No	15	21	14
3. Would you mind doing something like this again? (Almost all Ss--113--agree they would not mind.)				
4. Which part of the experiment did you like better?	Series I	20	6	5
	Series II	11	30	12
	Either	17	13	6
5. How well do you estimate you did?	Very Well	8	22	1
	Okay	23	25	18
	Poor	17	2	4
6. Did you like getting feedback (i.e., reinforcement)?	Yes	21	37	
	No	27	12	
7. Did the feedback help?	Yes	23	31	
	No	25	18	
8. Have you ever done anything like this before? (Only 8 say yes.)				
9. How involved were you?	Barely(1)	0	0	1
	(2)	6	1	3
	(3)	9	7	6
	(4)	17	22	9
	Much (5)	16	19	4

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ABSTRACT

800 Use of the verbal reinforcement technique (*VRT*) in developmen-
801 tal, personality, and socialization studies often rests on tenuous
802 and untested assumptions, e. g., that Ss having much early experience
803 with *VR* will be less responsive to it as adults, relative to others.
804 This study examined five variables which hypothetically relate to
805 performance under reinforcement: self-esteem of S, task-involvement,
806 experimenter, ordinal position, and family size. The method control-
807 led against informational advantages for the negative or positive
808 reinforcement conditions. Ss were college males. Postexperimental
809 data (from interview) indicated induction of all the manipulated var-
810 iables. Results were that *VR* had a main effect on performance (digit-
811 symbol task). Negative reinforcement was superior to both positive
812 reinforcement and to nonevaluative instructions, suggesting a psycho-
813 logical difference between criticism and praise. Low self-esteem Ss
814 improved more under criticism than did high self-esteem Ss. The only
815 other variable interacting with reinforcement was family size.
816 Small-family Ss responded more to reinforcement per se and specifical-
817 ly to positive reinforcement than large-family Ss. This finding ap-
818 pears inconsistent with the satiation hypothesis. Failure of other
819 variables to interact with *VR*--in spite of evidence that these var-
820 iables were successfully manipulated--suggests the assumptions of
821 much *VR* research need more direct testing.
822